



# **New Hampshire Department of Safety Division of Fire Standards & Training And Emergency Medical Services**

Recommended Curriculum for

## **ESOPHAGEAL TRACHEAL AIRWAY (COMBITUBE®) MODULE**

### **The Role of the NH**

EMT – Basic  
EMT- Intermediate  
EMT - Paramedic

July 2005

## Module Overview

### Student Eligibility

Emergency Medical Technicians licensed as Basics, Intermediates or Paramedics in the State of New Hampshire.

### Course Format

Although this material may be presented in a number of formats, other programs such as ACLS, PALS, BTLS etc. may not be substituted for this module.

### Credits

Massachusetts Office of Emergency Medical Services, Boston, MA.  
Walter Reed Army Medical Center Department of Anesthesiology, Washington, DC

### Objectives

*Upon completion of the training Module, the provider will be able to:*

- Discuss the New Hampshire Patient Care Protocol Advanced Airway Management Protocol/Failed Airway Options concerning Esophageal Tracheal Airway (Combitube) tube insertion.
- State the indications and contraindications of placing a Combitube tube.
- Describe the procedure of placing a Combitube tube.
- Demonstrate the placement of a Combitube tube in an airway manikin in a classroom setting.

### Motivation:

- EMS providers play an important role in the delivery of emergency care and are expected to provide care that is consistent with that provided within an Emergency Department (ED). Correct and timely airway management is one of the most important techniques utilized in the field. The NH Patient Care Protocol Advanced Airway Management Protocol/Failed Airway Options concerning Esophageal Tracheal Airway (Combitube) tube insertion attempts to align prehospital practice with ED care in NH and further address patients' needs.

### Teaching Methods

1. Lecture / Discussion
2. Video Tape Presentation
3. Practical Skill Sessions / Stations
4. Open Question and Answer Periods
5. Clinical Application in a Mannequin (Required)
6. Clinical Application in Operating Room (**Optional**)

### AV Equipment:

- Use various audio-visual materials relating to injuries of the head and spine. The continuous design and development of new audio-visual materials relating to EMS requires careful review to determine which best meet the needs of the program. Materials should be edited to assure meeting the objectives of the curriculum.

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## Primary Instructor:

- Any New Hampshire provider currently authorized to perform the skill of Combitube placement. This may include MD, PA, or RN. EMT-Paramedics or EMT-Intermediates who have previously completed this Module and are knowledgeable with the NH Patient Care Protocol Advanced Airway Management Protocol/Failed Airway Options are also eligible.

## Assistant Instructor:

- The instructor-to-student ratio should be 1:6 for psychomotor skill practice. This may include MD, PA, or RN. EMT-Paramedics, EMT-Intermediates or EMT-Basics who have previously completed this Module are knowledgeable with the NH Patient Care Protocol Advanced Airway Management Protocol/Failed Airway Options are also eligible.

## Instructor Activities

- Supervise student practice.
- Reinforce student progress in cognitive, affective, and psychomotor domains.
- Redirect students having difficulty with content.

## Evaluation

**Written:** Develop evaluation instruments, e.g., quizzes, verbal reviews, handouts, to determine if the students have met the cognitive and affective objectives of this lesson.

**Practical:** Evaluate the actions of the EMT students during role play, practice or other skill stations to determine their compliance with the cognitive and affective objectives and their mastery of the psychomotor objectives of this lesson.

**Remediation** Identify students or groups of students who are having difficulty with this subject content and work with student(s) until they have met the cognitive, affective and psychomotor objectives of this lesson.

**Enrichment** Identify what is unique in the local area concerning this topic and incorporate into local training modules.

**Time** Recommended Minimum Time to Complete: Four hours

## Notes for Instructors

- The device is supplied clean, non-sterile, for single patient use. The user is responsible for avoiding contamination before use. Device is not to be cleaned or reused.
- The Combitube is available in two sizes – the Combitube®, for patients 5 feet or taller, and the Combitube SA® for patients 4 feet to 5.5 feet tall.
- The Combitube® is available packaged singly (tube only, 5-18241), in a rigid plastic tray (5-18541) or in a roll-up kit (5-18441).
- The Combitube SA® is available packaged singly (tube only, 5-18237), in a rigid plastic tray (5-18537) or in a roll-up kit (5-18437).
- A training Combitube (with more durable cuffs) and training video are also available.

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- The Sheridan Combitube® and Combitube® packaging provides this cautionary statement:  
**“CAUTION: This product contains natural rubber latex which may cause allergic reactions.”**  
The manufacturer’s instruction sheet packaged with each tube (Sheridan printing 16623-00)  
should be read and understood by every user of the device.

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### References

#### Texts:

- Brady Basic Trauma Life Support, Fourth Edition, Campbell, John E., Prentice-Hall, Inc., 2000, pages 58-59, 290-292.
- Brady Paramedic Care: Principles & Practice, Volume 1: Introduction, Bledsoe, Bryan E., Prentice-Hall, Inc., 2000, pages 571-573.
- Emergency Medicine: Concepts and Clinical Practice, Fourth Edition, Rosen, Peter, Editor-in-Chief, 1998, pages 15-16.
- Guidelines 2000 for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care, An International Consensus on Science, International Liaison Committee on Resuscitation, Supplement to Circulation, Volume 102, Number 8, August 22, 2000, page I-98.
- National Registry of Emergency Medical Technicians, Advanced Level Practical Examination, Dual Lumen Airway Device (Combitube® or PTL®) skill sheet, NREMT, Inc., Columbus, OH, printing P304/8-003K, 2000.
- Paramedic Textbook, Second Edition, Sanders, Mick J., Mosby, Inc., 2000, pages 417-18.
- PHTLS Basic and Advanced Prehospital Trauma Life Support, Forth Edition, Prehospital Trauma Life Support Committee of the National Association of Emergency Medical Technicians in cooperation with the Committee on Trauma of the American College of Surgeons, Mosby, Inc., 1999, page 67, 86-88.
- Sheridan® Combitube® and Combitube SA® manufacturer's instructions and packaging, The Kendall Company, Mansfield, MA, printing 16622-00, 1998.
- Textbook of Advanced Cardiac Life Support, Cummins, Richard O., Editor, America Heart Association, 1997, page 2-11.

#### Journal Articles:

- "Successful prehospital airway management by EMT-Ds using the Combitube," Ochs, M, Prehospital Emergency Care, 2000 Oct-Dec; 4(4):333-7.
- "A comparison of two airway aids for emergency use by unskilled personnel, the Combitube and laryngeal mask," Yardy N, Hancox D, Strang T, Anaesthesia, 1999 Feb; 54(2): 181-3.
- "The PTL, Combitube, laryngeal mask, and oral airway: a randomized prehospital comparative study of ventilatory device effectiveness and cost-effectiveness in 470 cases of cardiorespiratory arrest," Rumball CJ, MacDonald D, Prehospital Emergency Care, 1997 Jan-Mar; 1(1) 1-10.
- "Airway management during cardiopulmonary resuscitation – a comparative study of bag-valve-mask, laryngeal mask airway, and Combitube in a bench model," Doerges V, Sauer C, Ocker H, Wenzel V, Schmucker P, Resuscitation, 1999 Jun; 41(1): 63-9.
- "Complications associated with the use of the Esophageal-Tracheal Combitube," Vezina D, Lessard MR, Bussieres, J, Topping C, Trepanier CA, Canadian Journal of Anaesthesia, 1998 Jan; 45(1): 76-80.
- "Ability of paramedics to use the Combitube in prehospital cardiac arrest," Atherton GL, Johnson JC, Annals of Emergency Medicine, 1993 Aug; 22(8): 1263-8.
- "Failed rapid sequence intubation in trauma patients: esophageal tracheal Combitube s a useful adjunct," Blostein PA, Koestner AJ, Hoak S, Journal of Trauma, 1998 Mar; 44(3): 534-7.
- Dr. A.I.J. Brain LMSSA, FFARCSI. "The Intavent Laryngeal Mask Instruction Manual". 1992.
- William Windham M.D. "the Combitube Alternative". 1998. JEMS.
- Chad Brocato, EMT-P. "The Combitube Unmasked". 1998. JEMS.

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**Module Outline**

**I. Overview**

- A. Welcome and Introduction of faculty
- B. Self-Introduction of participants
- C. Review of Objectives

**II. Introduction of Device**

- A. Introduction of Combitube Procedure Protocol
- B. History
  - 1. Developed in the early eighties.
  - 2. Intended to bridge the gap between a respiratory arrest situation and the institution of a definite airway when conventional endotracheal intubation is not immediately possible.
  - 3. Allows for a quick and easy method securing the patient's airway and adequately ventilating the lungs.
  - 4. Commonly employed prehospitally as a primary airway for basic providers and as a failed intubation alternative for advanced providers.

**III. Review of pertinent anatomy and physiology**

- A. Upper airway structures
- B. Upper gastrointestinal tract
- C. Airway grading

**IV. Documentation of Procedure**

- A. Documentation may include:
  - 1. Time procedure was performed
  - 2. Combitube type and size utilized
  - 3. Placement check, and by what manner
  - 4. Degree of difficulty encountered
  - 5. Complications encountered
  - 6. Name of provider performing procedure

**V. Combitube manufacturer's video instruction**

- A. Video appropriate to the device to be utilized.

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## VI. Equipment and Procedure

### A. Equipment

1. Body Substance Isolation equipment
2. Laryngeal Mask Airways of appropriate sizes
3. Syringe with appropriate volume for Combitube cuff inflation
4. 10 or 12 Fr suction catheter
5. Water-soluble lubricant
6. Tape or other device(s) to secure Combitube
7. Stethoscope
8. Ventilation equipment
9. Oxygen source
10. Suction device

### B. Indications

1. When immediate airway control is desired in the absence of endotracheal intubation.
2. Airway control in the absence of other effective methods (e.g. failed airway).
3. Situations involving a difficult mask (BVM) fit.

### C. Contraindications

1. The known contraindications:
  - a) Has ingested a caustic substance or is at risk of aspiration.
  - b) The patient has an intact gag-reflex or are not profoundly unconscious and who may resist Combitube insertion.
  - c) Severe maxillofacial or oropharyngeal trauma.
  - d) The patient is less than 5 feet tall or under 16 years old
  - e) The patient has known esophageal disease
  - f) Burns involving the airway
  - g) Any allergy or sensitivity to latex (the pharyngeal balloon contains latex)

**NOTE: Not all contraindications are absolute**

#### 2. Warnings, Cautions, and Adverse Effects

- a) Throat soreness
- b) Dryness of the throat and/or mucosa
- c) Aspiration

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D. Description of a Combitube?

1. A double lumen airway device designed for emergency ventilation of a patient in respiratory arrest when visualization of the airway and endotracheal intubation are not possible
2. The pharyngeal balloon fills the space between the tongue and soft palate, Eliminating the need for a mask and the associated face mask seal problems
3. The patient can be successfully ventilated regardless if the tube is inserted into the trachea or the esophagus

E. Step 1: Size Selection

1. Verify that the size of the Combitube is correct for the patient

F. Step 2: Examine the Combitube

1. Visually inspect the Combitube cuff for tears or other abnormalities
2. Deflate the cuff to ensure that it will maintain a vacuum
3. Inflate both balloons prior to insertion to test the integrity of the balloons
4. Should either balloon fail after insertion, maintenance of the patient's airway cannot be assured

G. Step 3: Deflation & Inflation

1. DO NOT force the tube. If it does not advance easily, redirect it or withdraw and reinsert.
2. Use appropriate size syringes that come with the device to inflate and deflate balloons.

H. Step 4: Lubrication

1. Lubricate the tube with sterile, water soluble lubricant
2. Only lubricate the Combitube just prior to insertion
3. Lubricate thoroughly

I. Step 5: Positioning of the Airway

1. Extend the head and flex the neck (in the absence of trauma)
2. Position the patient's neck in a neutral position.



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### J. Combitube Insertion Technique

#### 1. Step 1

- a) Place the patient in a supine position
- b) Provide artificial ventilation via BVM and hyperventilate the patient with 100% oxygen prior to device insertion

#### 2. Step 2

- a) Lift the tongue and lower jaw upward to open the oropharynx
- b) Insert the Combitube so that it curves in the same direction as the natural curvature of the pharynx
- c) If resistance is met, withdraw tube and attempt to reinsert
- d) Advance tube until the patient's teeth are between the two black lines

#### 3. Step 3

- a) Esophageal Placement
  - (1) If the Combitube is placed in the esophagus, the distal balloon will occlude the esophagus.
  - (2) Ventilations are provided through perforations in the side of the pharyngeal tube.
  - (3) Stomach contents can be safely expelled via the hole in the end of the tube.
- b) Tracheal Placement
  - (1) If placed in the trachea, it functions as an endotracheal tube, with the distal balloon preventing aspiration.
  - (2) Ventilations are provided via the hole in the end of the tube.
  - (3) Stomach contents can be safely expelled via perforations in the side of the pharyngeal tube.

#### 4. Step 4

- a) Connect the Combitube to a Bag-Valve Mask device or low pressure ventilator
- b) Ventilate the patient while confirming equal breath sounds over both lungs in all fields and the absence of ventilatory sounds over the epigastrium

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- c) Place a bite-block or roll of gauze to prevent occlusion of the tube should the patient bite down.
- d) Secure the Combitube Using the same techniques as those employed in the securing of an endotracheal tube.
- e) During ventilation observe end-tidal CO2 monitor and/or pulseoximetry to confirm oxygenation

**VII. Summary**

- A. Studies suggest that the Combitube is an airway device that prehospital providers “adapt to rapidly” and have demonstrated success.
- B. Though endotracheal intubation remains the definitive technique for securing an airway in the prehospital setting, the Combitube may be life saving when intubation has failed or is not available.

**VIII. Student practical skill sessions/stations**

- A. Using training manikin capable of accepting a Combitube.
- B. Scenario-based skill sessions using case studies. (Sample cases follow this outline).

**IX. Written and/or Practical Examination**

**X. Review, Questions and Answers**

**XI. Optional Clinical Experience (4 - 8 hours)**

- A. Complete four to eight hours of clinical time in an operating room focusing on airway management issues, complications, and tricks.
- B. Successfully place the Combitube device in three patients in an operating room setting under the direct supervision.
- C. Document the Combitube placement attempted/completed during the clinical experience.

**XII. Total Module Time – Didactic: 4 hours**

- A. Student practical skill sessions/stations (20 to 60 minutes)
  - 1. Recommended one instructor per six to eight students and one training manikin capable of accepting a Combitube tube.
  - 2. Skill sessions should be scenario-based (see attached sample cases.)
  - 3. Larger groups may benefit from station rotation in timed intervals.
- B. Written and/or Practical Examination (30 minutes)
- C. Review, Questions and Answers (5 to 15 minutes)

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**Module Sample Cases**

**Case One**

A 37-year-old female patient collapsed in her living room. She is in cardiac arrest and routine ACLS care is in progress. You have been unable to intubate the patient's tracheal after multiple attempts, and your attempts at bag-valve-mask ventilation are inadequate. Using the manikin and materials provided, describe and perform all airway maintenance procedures indicated by New Hampshire Protocols.

**Case Two**

A 15-year-old female pedestrian was struck by a motor vehicle at a moderate speed. She unconscious to deep painful stimuli and is suffering from severe facial trauma. Your efforts at maintaining the patient's airway with BLS techniques and generous suctioning are inadequate. The patient is approximately 5 feet tall. Using the manikin and materials provided, describe and perform all airway maintenance procedures indicated by New Hampshire Protocols.

**Case Three**

You are called to the local recreational center where the lifeguards have removed a ten-year-old male patient from the pool. You find him deeply unconscious, without a gag reflex. His respirations number 4 per minutes and he has a blood pressure of 150/100 mmHg. He has been c-spine immobilized before your arrival. The patient is over four feet tall. As you prepare to intubate the patient, you find your laryngoscope is not operational. Using the manikin and materials provided, describe and perform all airway maintenance procedures indicated by New Hampshire Protocols.

**Case Four**

A 31-year-old male patient was involved in a motorcycle accident. He does not respond verbally, is bleeding from facial injuries, and is combative while lying supine on the roadside. His vital signs are BP 88/P, P134, and R44. Using the manikin and materials provided, describe and perform all airway maintenance procedures indicated by New Hampshire Protocols.

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**Performance Checklist**

Provider's Name \_\_\_\_\_ Date \_\_\_\_\_

NH License Number # \_\_\_\_\_ Level (circle) EMT EMT-I EMT-P

Service \_\_\_\_\_

.....  
**When demonstrating the insertion of an ETA tube (Combitube®), the provider should:**

	<b>Pass</b>	<b>Fail</b>
Verbalizes the indications for the Airway	<input type="checkbox"/>	<input type="checkbox"/>
Verbalizes the contraindications for the Airway	<input type="checkbox"/>	<input type="checkbox"/>
Proper use of PPE	<input type="checkbox"/>	<input type="checkbox"/>
Assembles all necessary equipment, selects proper size device	<input type="checkbox"/>	<input type="checkbox"/>
Ventilates patient prior to insertion	<input type="checkbox"/>	<input type="checkbox"/>
Tests cuff integrity properly (blue 100cc, white 15cc)	<input type="checkbox"/>	<input type="checkbox"/>
Lubricates tube	<input type="checkbox"/>	<input type="checkbox"/>
Attaches fluid deflector elbow to #2 lumen	<input type="checkbox"/>	<input type="checkbox"/>
Opens and clears airway and positions head properly	<input type="checkbox"/>	<input type="checkbox"/>
Inserts device properly into mouth and gently advances to correct depth	<input type="checkbox"/>	<input type="checkbox"/>
Inflates pilot balloons in correct order and volume of air, removes syringes	<input type="checkbox"/>	<input type="checkbox"/>
Ventilates through correct lumen and auscultates breath sounds	<input type="checkbox"/>	<input type="checkbox"/>
Verbalizes appropriate breath sounds for correct placement	<input type="checkbox"/>	<input type="checkbox"/>
Verbalizes proper suctioning method	<input type="checkbox"/>	<input type="checkbox"/>
Verbalizes proper method for repositioning	<input type="checkbox"/>	<input type="checkbox"/>
Verbalizes proper ET intubation method with ETA in place	<input type="checkbox"/>	<input type="checkbox"/>
Properly secures device in place	<input type="checkbox"/>	<input type="checkbox"/>

<b>Final Performance</b>	<b>PASS</b>	<b>FAIL</b>
	<input type="checkbox"/>	<input type="checkbox"/>

**Comments** \_\_\_\_\_  
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\_\_\_\_\_

**Instructor / Examiner Print Name** \_\_\_\_\_

\_\_\_\_\_  
Credentials

**Instructor / Examiner Signature** \_\_\_\_\_

\_\_\_\_\_  
Date